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Abstract

This article examines the role different aid allocation models play not only for conventional development aid but also for two new financial flows, adaptation and mitigation aid. We first test the three models proposed in the literature – recipient need, recipient merit, and donor interests – using the latest available aid data and compare our results with findings of older studies on Africa, and with studies on aid allocation on a global scale. We find that the recipient merit model in more recent years no longer plays a role for development aid allocation in Africa, in line with findings reported globally. In contrast to such global studies, the logic of the donor interest model does not seem to dominate over the recipient need model in the African context, as both are of equal importance for aid allocation decisions. Finally, additionality seems to play a lesser role in Africa than globally.

Keywords

Africa, aid allocation, development aid, climate aid

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Introduction

Africa today faces a twin development challenge – of developing economically while also facing the consequences of climate change. In both areas, the region has limited capacities, as acknowledged for instance in the climate negotiations (see e.g. UNFCCC, 2015: particularly Article 2). For this reason, global initiatives to help African countries deal with this twin challenge are of high importance today. In particular, the reaction of international donors, both bilateral and multilateral, towards Africa's funding needs are of high relevance for the continents' capacity to attain sustainable development. Thus, this article explores aid allocation patterns of various aid flows targeting primarily development objectives on the one hand and climate objectives on the other.

To be more specific, we study the relationship between bilateral aid flows from Organisation for Economic Co-operation and Development (OECD) donors to African recipients. We investigate whether the allocation mechanisms driving development aid flows are distinguishable from those targeting climate objectives, as promised by donors under the term "additionality" (UNFCCC, 2009, 2010). For all aid flows, both targeting development and climate objectives, we first investigate whether the three traditional aid allocation mechanisms proposed in the literature – recipient need, recipient merit, and donor interests (see e.g. Alesina and Dollar, 2000; Dollar and Levin, 2006) – do play a role in the African region. Furthermore, for the recipient merit model, we explore whether in more recent years the recipient merit has declined in importance due to the increased competition with new donors such as China, as proposed by Woods (2008) and Kilama (2016). Finally, for the climate flows adaptation and mitigation aid, captured by the Rio Markers and reported by the OECD (2011), we study whether the fourth allocation mechanism – additionality – does play a role over and above the three traditional mechanisms. For adaptation aid, we operationalise additionality as the climate-specific need of countries to adapt to climate change, that is, how physically vulnerable they are to climatic changes (ND-GAIN, 2013; Weiler et al., 2018), while for mitigation aid we follow Bagchi et al. (2016) who state that mitigation efforts represent a public good, hence this form of aid should target those countries with the highest greenhouse gas emissions.

Given the available aid data provided by the OECD (2018) and other sources capturing our independent variables, we are limited to study aid allocation from 1996 to 2016 for 28 OECD donors to 53 African recipient countries. Thus, for each year, we have a fully dyadic data set capturing the various aid flows from each donor *i* to each recipient *j*. We test our expectation using two-stage Cragg models (Clist, 2011; Cragg, 1971), that is, for all aid flows, we run a selection stage model capturing whether a specific recipient *j* does get aid from donor *i* in a given year. The allocation stage then models the amount of aid provided for all country pairs for which aid has been recorded in a given year. Thus, this study adds to the existing literature in various ways. First, it revisits the three traditional aid allocation models for the African context using the newest available data. Second, it contrasts climate and development aid in Africa to see whether different allocation mechanisms apply. Finally, it contrasts these findings for the African context with those reported at the global level. The results indicate that the three traditional aid

allocation mechanisms do play a role for all aid flows, that is, climate flows tend to follow similar patterns as conventional development aid flows, while the additionality measures of these climate aid flows are only weak allocation determinants in the African context.

The next section presents an overview of the existing literature and thereof derives our expectations, then we present our data and the research design, followed by a discussion of the results of the statistical analysis. The last section concludes.

Literature Review and Expectations

There is a plethora of studies in the development literature, from older to more recent, on general development aid allocation to developing countries (Ball and Johnson, 1996; Collier and Dollar, 2002; Dollar and Levin, 2006; Stokke, 1989; White and McGillivray, 1995). While various studies have different foci of aid, for instance, they might focus on the consequences generated by aid flows (see Hagmann and Reyntjens, 2016, for an overview) or the effectiveness of aid (for two recent studies, see Bigsten and Tengstam, 2015; Gehring et al., 2017). In this study, however, we contribute to the question relating to the motives of donors to provide aid, that is, why do they allocate their aid in a certain why, with a focus on aid flows to African recipients. Specifically, our aim is to (1) check whether aid allocation mechanism found in the literature do hold in the African context and (2) compare these mechanisms for development aid flows and the newer climate aid flows.

Donor's motives for aid allocation have received a fair amount of attention in the literature, and it should be noted that studies investigating aid allocation patterns often show that they vary widely among donors (e.g. White and McGillivray 1995). This should be kept in mind in the following discussion. Work focusing on the rationale for providing aid, starting in the 1970s, traditionally distinguishes between two sets of motivations: the desire to help the poor on the one hand (Dudley and Montmarquette, 1976) and the simple and self-motivated desire to help oneself on the other (Dudley and Montmarquette, 1976; McKinley, 1978; McKinley and Little, 1977, 1979). Former prime minster of Britain, David Cameron, referred to these two motives slightly different as the "heart" argument, the wish to do good, and the "head" argument, the motivation of benefiting domestically from foreign aid flows (cited in Betzold and Weiler, 2018). In the literature, these two arguments are more commonly referred today as the recipient need and the donor interest models of aid allocation (McKinley and Little, 1977). More recently, a third model of aid allocation was added, the recipient merit model. Adherents of this model argue that aid allocation is positively associated with how well recipient countries are governed, first because sound economic policies and stable democratic institutions ensure that aid is used to benefit the people the flows are intended for, which leads to aid effectiveness (United Nations, 2002: 6; 14) and second because donors, who are for the most part highly democratic countries, intrinsically value the good governance and democratic institutions (Younas, 2008; Zanger, 2000).

We now briefly review the empirical evidence underpinning each aid allocation model based on (general) studies, before discussing them in the African context. Donor self-interest has typically been debated in terms of the economic potential for domestic

exporters, colonial ties, or the political influence on aid recipients on the world stage (Hagmann and Reyntjens, 2016). While Stokke (1989) finds that donor's self-interests are the key determinant of aid allocation, other studies are somewhat less negative and provide evidence that a mix between donors' self-interests and the more altruistic recipient needs motives are at play when aid allocation decisions are made (Alesina and Dollar, 2000; Berthélemy, 2006a, 2006b; Drury et al., 2005; Hoeffler and Outram, 2011). Most, however, conclude that the former tend to be the stronger determinant of aid allocation than the latter, but also that variations between donors are stark (Alesina and Dollar, 2000; Clist, 2011; Younas, 2008). The evidence in favour of the recipient merit model, that is, the claim that donors react to good governance in recipient countries by providing more aid, is quite mixed, with some studies finding only limited evidence for this relationship (Dollar and Levin, 2006; Figaj, 2010), while more recent studies on climate aid do report stronger favourable results (Betzold and Weiler, 2018; Weiler et al., 2018).

While the mentioned studies tend to have a global focus, that is, they investigate aid provision to all developing countries, relating these findings to Africa is more difficult, as work on aid allocation to African countries is relatively scarce, with most studies either being relatively old by now or looking at aid disbursements of individual donors only. The few studies we could identify on Africa often report similar results to the general aid allocation literature. Schraeder et al. (1998), who studied thirty-six African recipient countries, conclude that economic interests of donors are more important than development needs of the recipients for aid allocation decisions. Riddell (1999) goes a step further and claims that "donor aid levels are not critically linked to needs in Africa", thus implying that the recipient need model does not hold in the African context. In contrast, Tuman and Ayoub (2004) find, for the specific case of Japanese aid to African countries, that not only self-interest but also recipient needs play a significant role for the country's aid allocation decisions, which is an indication for the above-mentioned variation between donors. In the light of these findings, we expect for the African context that donor interests play a clear role (H1), with recipient needs also potentially being a significant driver of aid allocation decisions as well, but maybe to a lesser degree (H2). With regard to Africa, there is particular doubt about the validity of the recipient merit model. In this context, van de Walle (2016) even speaks of "Africa democracy fatigue," a backlash against democracy and democracy promotion in Africa, which is increasingly accepted by donors. Underlying this trend are various factors. First, the idea that development is best achieved in countries not held back by the complications of multi-party democracies, but in countries following the "Beijing Model" with single parties and authoritarian rule, in which decisions can be made fast and be enforced efficiently (van de Walle, 2016). This line of thought harks back to modernisation theories which "provided an intellectual justification for authoritarian state-led development interventions" (Hagmann and Reyntjens, 2016: 15). According to Olsen (2002), this shift in priorities away from democracy promotion to more self-interested goals can be seen in the policy shift of the EU policy towards Africa since the end of the cold war in general. The second factor is the emergence of China as a new and big donor on the African stage, without demanding good governance from recipients. This newcomer

induces competing Western donors increasingly to also abstain from such demands as well (Woods, 2008). Indeed, there is evidence that OECD donors do react and provide more aid when China increases its activity in African countries (Kilama, 2016). Third, as African countries started (on average) to grow stronger and to attract more foreign direct investment, the reliance on Western aid diminished, as did the leverage of donors to impose conditionality. Finally, the idea that good governance is rewarded through aid in the short-run, and thus in the long-run is promoted as countries have an incentive to improve their governance to attract higher aid-levels, is thwarted by findings that aid may instead lead to a deterioration of governance in Africa (Bräutigam and Knack, 2004; Hagmann and Reyntjens, 2016; Knack, 2004). This undermines the rationale for imposing conditionality in the first place. Therefore, we expect that good governance only plays a secondary role (if at all) in the African context, particularly in more recent years (H3).

We now turn to the discussion of climate aid, and how this relatively new form of aid is allocated. Recent studies have shown that the three allocation models (recipient need, recipient merit, donor interests) are also of relevance in the realm of climate aid (Figaj, 2010), and individually for both adaptation aid (Betzold and Weiler, 2018; Michaelowa and Michaelowa, 2012; Robertsen et al., 2015; Robinson and Dornan, 2017; Weiler et al., 2018) and mitigation aid (Bagchi et al., 2016; Halimanjaya, 2015). In particular Weiler et al. (2018) mention that adaption aid flows follow "very closely" the pattern of general aid flows to developing countries. This, however, calls into question whether the new climate finance is indeed "new and additional," as promised by donors during the climate negotiations. Although the issue and definition of additionality is contested between donors and recipients (Betzold and Weiler, 2018; Clemens and Moss, 2011; Stadelmann et al., 2011), the question arises whether for the two new aid flows – adaptation and mitigation aid – a fourth model of aid allocation capturing additionality does play a role, in addition to the three conventional models discussed above.

For adaptation aid, this extra dimension is captured by recipient countries' vulnerability to climate change impacts, that is, how strongly they are affected by a changing climate (Weiler et al., 2018). While vulnerability is a contested concept (Adger, 2006), it is most commonly subdivided into exposure, sensitivity, and adaptive capacity (Muccione et al., 2017; ND-GAIN, 2013). However, adaptive capacity can largely be seen as a matter of resource availability and thus overlaps strongly with the recipient need model of conventional development aid (Betzold and Weiler, 2018), and sensitivity is, to a large degree, sector-specific (Weiler, 2019). Thus, for the purpose of this article, we define additionality in the area of adaptation aid as that part of aid flows that are provided because countries are physically exposed to climate impacts, that is, "the physical factors external to the system that contribute to vulnerability" (ND-GAIN, n.d.) or the "degree to which a system experiences environmental stress" (Adger, 2006: 270). It should be noted that physical exposure can be seen as a substitute of recipient need (instead of poverty) when focusing solely on the adaptation aid domain (e.g. as done by Betzold and Weiler, 2018). However, we are interested in distinguishing between the traditional way to capture recipient need, that is, poverty, from climate-specific recipient need, that is, exposure, to climate impacts. If the latter is driving adaptation aid allocation in Africa, for the purpose

of this article, we equate this climate-specific recipient need with additionality, as it captures an additional dimension of aid allocation different from the traditional recipient need model to which we compare adaptation aid allocation. We, therefore, expect countries more exposed to climatic changes to receive more adaptation aid (H4a).

To define additionality for mitigation aid, we build on Bagchi's et al. (2016) statement that particularly for this form of aid "the traditional recipient need criteria [...] would be completely misleading" (p. 10). Instead the authors argue that as mitigation efforts represent a global public good, mitigation funds should be targeted at recipients where they can make the biggest difference, that is, where emissions are highest and the global benefits from resulting emission reductions are largest. Thus, we hypothesise that countries with larger per capita CO_2 emissions should receive higher amounts of mitigation aid (H4b).

Methods and Data

Dependent Variables

We use three dependent variables in the statistical analyses below to test our expectations: per capita development aid flows (minus climate aid flows),[1] per capita adaptation aid flows, and per capita mitigation aid flows. To generate these variables, we use data from 1996 through 2016 for 28 OECD donors to 53 African recipients for development aid flows, while for the climate aid flows only the years 2010 to 2016 are considered. All data are taken from the OECD (2018) Creditor Reporting System (CRS), which provides dyadic data for aggregate development aid flows on the one hand but also on project-level data of official development assistance, including whether funding is relevant for climate change adaptation and/or mitigation (according to donors' own classification). Thus, for the climate aid flows we use the Rio Markers system,[2] by which OECD donors since 2010 have identified projects where adaptation or mitigation were the principal (i.e. main) or a significant (i.e. not the main, but still important) objective (see OECD, 2011). Using these Rio Markers, we are able to calculate overall climate aid flows from donor *i* to recipient *j* in a given year.[3] This value is then subtracted from the overall aid flows for this donor–recipient dyad in the same year reported to the OECD. To calculate adaptation and mitigation aid flows, all projects tagged with the appropriate Rio Marker for all donor–recipient pairs are summed for the years 2010–2016. We apply this procedure to all projects where adaptation or mitigation were the principal (i.e. main) or a significant (i.e. not the main, but still important) objective. Since projects can, for instance, have adaptation as a main and mitigation as a significant objective, the two climate aid flows are not mutually exclusive. To make the three thus calculated annual aid flows comparable between recipients, in a final step, the per capita aid each recipient receives is calculated by dividing the flows by the countries' population.

It should be noted here that the reliability of the OECD DAC data is, to some degree, in doubt (Adaptation Watch, 2015; Michaelowa and Michaelowa, 2011). The reason behind this is the self-reporting of donors and a lack of independent quality control, which potentially leads to – sometimes significant – overestimation of aid flows

(Weikmans et al., 2017). This is clearly problematic, yet a recent reassessment of the data quality has revealed that the quality has improved and that misreporting is down to approximately 10 per cent (Bagchi et al., 2016). While further improvements of the data are desirable, they are the most comprehensive available data, and we consider the coding error reported by Bagchi and colleagues to be acceptable for the purpose of this study.

Independent Variables

The predictor variables included in the all models are the following:

GDP per capita *(recipient need):* Per capita GDP for recipient countries is taken from the World Development Indicators (WDIs) at 2010 constant US$ (World Bank, 2018). In the models, the data are log-transformed. Since there is the potential endogeneity problem of aid positively affecting GDP, we include this variable using a one-year lag in the models below. GDP per capita provides a measure of poverty and a country's financial resources, so it is an important predictor for the allocation of both climate and non-climate aid. How wealthy a country is can also be seen as an important indicator of how well it will be able to cope with climatic changes. Hence, in the models using the climate aid flows as dependent variables, this indicator is part of capturing the vulnerability of recipients to climate change.

LDC dummy (recipient need): The models include a dummy variable for countries that are classified by the UN as least developed countries (LDCs). Our expectation is that these countries receive higher levels of development aid, as well as adaptation-related and mitigation-related climate finance, owing to (respectively) their significant development challenges, vulnerability to climate change, and limited financial resources.

Governmental quality (recipient merit): A proxy for the quality of government in recipient countries is taken from the World Bank's Worldwide Governance Indicators (WGIs; Kaufmann and Kraay, 2018; Kaufmann et al., 2011). All six main indicators (voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption) were aggregated, giving equal weight to each indicator. In the statistical models, the data are lagged by one year. Higher WGI scores indicate that the recipient is better able use aid funds adequately, which may lead to a positive relationship with both climate and non-climate aid. At the same time, lower WGI scores indicating less government capacity may signal greater need for aid funds. Since the WGIs only exist since 1996, this indicator limits the time scale for the analysis of the general aid data.

Total exports (donor interest): We employ dyadic data on exports from the donor to the recipient as a measure of the economic interests of donors, with the data taken from the UN Comtrade database (United Nations Statistics Division, 2018). The data are log-transformed. The greater the value of exports from donor countries to recipients, the more likely it is in their interest to provide aid to the partner country (Younas, 2008). We, therefore, expect a positive relationship between increased trade flows and "general" development assistance. Strictly speaking, trade should not affect the allocation of aid for adaptation and mitigation, given the stated purpose of these financial flows, though our expectation is that the two are linked.

UN voting (donor interest): Diplomatic relations and similarities in the preferences in world politics between donors and recipients are captured in the UN General Assembly Voting Data (Strezhnev and Voeten, 2013). We use the two-category dyadic affinity scale ranging from −1 (*least similar interests*) to 1 (*most similar interests*). The data are lagged by one year. The more similar the preferences of donors and recipients in the international sphere, the more adaptation aid flows we expect to see.

Colonial ties (donor interest): Data on colonial ties between donors and recipients were retrieved from the Quality of Government Institute (Teorell et al., 2015). Given that donors often maintain close ties with former colonies, we expect former colonies to receive more development assistance. Once again, we expect this to hold true for climate finance, despite this being contrary to its stated purpose.

Population: Data on recipient countries' population is taken from the WDI (World Bank, 2018). In the statistical models, the data are again log-transformed. Population is an important predictor of development assistance (for both climate and non-climate aid). Larger countries are of greater geopolitical interest and more likely to receive aid, but at the same time, population size influences the level of aid per capita, with smaller countries receiving relatively more aid per capita.

In the models using climate aid as dependent variables, we also include a measure of the mitigation potential of recipient countries as well as their vulnerability to climate change:

Vulnerability to climate change (additionality adaptation): While there are various ways to capture vulnerability to climate change, the approach which has gained wide recognition conceptualises vulnerability as having three dimensions: physical exposure, sensitivity, and adaptive capacity (Adger, 2006; Muccione et al., 2017; Smit and Wandel, 2006). While the latter is already captured using GDP per capita, a system's sensitivity is very sector dependent (Weiler, 2019). Thus, we include a measure of physical exposure to capture countries' vulnerability to climate change impacts. Adger (2006) describes exposure as the "degree to which a system experiences environmental stress" (p. 269). Consequently, the Notre Dame Global Adaptation Index (ND-GAIN, n.d.) operationalises exposure as "the physical factors external to the system that contribute to vulnerability," and we use this measure in the models below.

Mitigation potential (additionality mitigation): To capture countries' mitigation potential, we use their CO_2 emissions per capita as provided by the WDIs (World Bank, 2018). Greenhouse gas emissions, as a global public good, should ideally be reduced where it is cheapest, thus donors have an opportunity to provide mitigation aid particularly to countries with higher emissions to increase the impact of the funds. On the other hand, countries with larger per capita emissions can be seen as carrying more responsibility for climatic changes, which might lead to lower levels of adaptation funds flowing to such countries, as this is considered compensation payment for damages caused by others.

Modelling Strategy

We apply a two-stage Cragg's model (Clist, 2011; Manning et al., 1987) for the three types of aid serving as dependent variables, following some recent studies on climate aid (e.g. Halimanjaya, 2015; Weiler et al., 2018). Such models, also called double hurdle

models (Cragg, 1971), distinguish between a selection and an allocation stage. In the selection stage, donors decide whether to provide aid to a recipient country, and in the allocation stage, they make decisions on the amount of aid they distribute to the selected donors. The double-hurdle model is appropriate when the decisions to cross the two hurdles are made separately, that is, are made at different points in time. Since decisions on aid recipients are usually made for an extended period of time, while projects are selected on a rolling basis, the double-hurdle model is appropriate when considering aid allocation decisions. The two stages are econometrically modelled separately, but the allocation stage must be interpreted conditionally on receiving aid at the selection stage (Clist, 2011).

In both stages, we include donor and year random effects, as a donor's adaptation aid allocations to many recipients in a given year cannot be regarded as entirely independent decisions, and there are also reasons to believe that there is some form of coordination between donors. The two stages of the Cragg's model are implemented in R using the lme4 package (Bates et al., 2015).

Results

In this section, we test the theoretical expectations for aid allocation in Africa using the two-stage Cragg's model and summarise the most important findings of this statistical analysis. Table 1 lists the results of the selection stage, that is, the stage in which the decision whether aid is provided or not is modelled. This stage therefore uses a binary measure taking on the value of 1 when the form of aid in question was provided, and 0 otherwise. Table 2 exhibits the findings of the allocation stage, that is, the amount of aid (in million constant US$) only for those recipients that where selected in the first stage is modelled here. Both tables include four models. Model 1 captures overall development aid (minus climate aid) since 1996, while model 2 only includes the years since 2010 (which allows direct comparison with the climate aid based on the Rio Markers, but also an assessment of how development aid allocation has changed in recent years). Model 3 of both tables lists the results for adaptation aid and model 4 for mitigation aid.

We will progress as follows. First, we discuss donor interests (H1) needs and recipient needs (H2), followed by a discussion of the validity of the recipient merit model (H3). Then we will take a look at additionality in the case of adaptation and mitigation aid (H4a and H4b) and check whether these allocation logics do play a role for these new forms of aid, as promised by the donors.

Recipient Need and Donor Interests

In this section, we check whether our hypotheses are confirmed that the donor interests and the recipient merit models do play a role in the African context, with the additional expectation that the former is the stronger predictor of aid allocation decisions than the latter.

Of the donor interest variables, the economic ties measure – that is, bilateral trade – is of particular importance both in the selection and in the allocation stage, according to the models. However, this effect does not appear to domineer as strongly as expected. For instance, in the selection stage of the development aid model since 2010 of Table 1, a

Table 1. Selection Stage Models.

	Dependent Variable			
	Development aid (all)	Development aid (since 2010)	Adaptation aid	Mitigation aid
GDP per capita (log)	−0.470*** (0.028)	−0.405*** (0.049)	−0.557*** (0.062)	−0.577*** (0.065)
LDCs dummy	−0.430*** (0.059)	−0.543*** (0.101)	0.059 (0.098)	−0.044 (0.102)
WGI index	0.058*** (0.006)	0.015 (0.011)	0.171*** (0.011)	0.187*** (0.012)
Exports (log)	0.026*** (0.006)	0.031** (0.013)	0.130*** (0.021)	0.222*** (0.025)
UN voting	−0.069 (0.123)	0.522** (0.204)	−0.206 (0.197)	−0.241 (0.195)
Colony dummy	5.406*** (0.519)	5.698*** (1.034)	2.431*** (0.186)	2.012*** (0.182)
ND-GAIN exposure			3.499*** (0.571)	3.434*** (0.591)
CO_2 emissions			−0.025 (0.026)	−0.011 (0.026)
Population (log)	0.617*** (0.018)	0.679*** (0.034)	0.625*** (0.036)	0.559*** (0.038)
Intercept	−4.977*** (0.640)	−6.510*** (0.860)	−10.825*** (0.813)	−11.189*** (0.824)
AIC	17,648.658	5,902.752	7,007.840	6,669.674
BIC	17,730.321	5,973.740	7,092.510	6,754.343
Log likelihood	−8,814.329	−2,941.376	−3,491.920	−3,322.837
Num.obs	26,014	8,944	8,568	8,568
Num.groups: Donor	26	26	26	26
Num.groups: Year	21	7	7	7
Var: Donor (intercept)	6.423	6.470	2.403	1.787
Var: Year (intercept)	0.077	0.008	0.011	0.000

Note: LDC = least developed countries; WDI: Worldwide Governance Indicator; AIC: Akaike information criterion; BIC: Bayesian information criterion.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

change in exports from the lowest to the highest value is, all else equal, predicted to increase the likelihood of receiving aid only by about 15 per cent. In contrast, for the variable capturing recipient need – that is, GDP per capita – it can be seen in Figure 1 (top-right panel) that the poorest countries are highly likely to receive at least some development aid from a given donor, with values above 85 per cent, while this probability drops significantly and below 50 per cent for the richest countries in the data set. Looking at the full sample including all years, the GDP effect is even stronger (see top-left panel of Figure 1), while the trade effect has about the same magnitude. In the

Table 2. Allocation Stage Models.

	Dependent variable			
	Development aid (all)	Development aid (since 2010)	Adaptation aid	Mitigation aid
GDP per capita (log)	−0.698*** (0.098)	−1.112*** (0.163)	0.258*** (0.098)	0.089 (0.185)
LDCs dummy	−1.094*** (0.190)	−0.972*** (0.306)	−0.069 (0.144)	−0.250 (0.268)
WGI index	0.157*** (0.020)	0.130*** (0.034)	0.039** (0.017)	0.098*** (0.033)
Exports (log)	−0.209 (0.354)	−0.637 (0.575)	−0.095 (0.225)	−0.152 (0.408)
UN voting	11.480*** (0.338)	11.107*** (0.565)	0.147 (0.221)	−1.023 (0.373)
Colony dummy	0.256*** (0.023)	0.056*** (0.057)	0.056** (0.026)	(0.173)*** (0.054)
ND-GAIN exposure			1.645* (0.871)	2.140 (1.645)
CO_2 emissions			−0.080** (0.038)	−0.062 (0.067)
Population (log)	−1.361*** (0.059)	−1.550*** (0.105)	−0.329*** (0.051)	−0.554*** (0.095)
Intercept	25.891*** (1.400)	27.775*** (2.200)	2.643** (1.235)	5.887*** (2.265)
AIC	12,6870.010	45,249.113	10,834.969	11,857.010
BIC	12,6955.709	45,323.535	10,910.393	11,930.743
Log likelihood	−63,424.005	−22,613.556	−5,404.485	−5,915.505
Observations	17,868	6,410	2,445	2,147
Num.obs	26	26	25	25
Num.groups: Donor	21	7	7	7
Num.group: Year	4.922	6.881	0.168	0.407
Var: Donor (intercept)	0.091	0.000	0.000	0.020
Var: Year (intercept)	70.413	66.972	4.762	14.218

Note: LDC = least developed countries; WDI: Worldwide Governance Indicator; AIC: Akaike information criterion; BIC: Bayesian information criterion.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

allocation stage, this changes slightly. Panels (a) and (b) of Figure 2 show that the poorest countries in the data set can expect to receive about US$4–5 more per capita than the richest, which is again evidence in favour of the recipient needs model. However, in this allocation stage, the findings of the trade variable indicate that aid flows are predicted to increase from only about US$2 per capita at the lowest levels of trade to about US$ 10 at the highest. This indicates that, in this second stage of aid disbursement, donor self-interests play a (somewhat) stronger role than recipient needs.

Taken together, these findings are interesting as they indicate that Riddell's (1999) notion that aid is not linked to needs in Africa is, using the newest available data, no

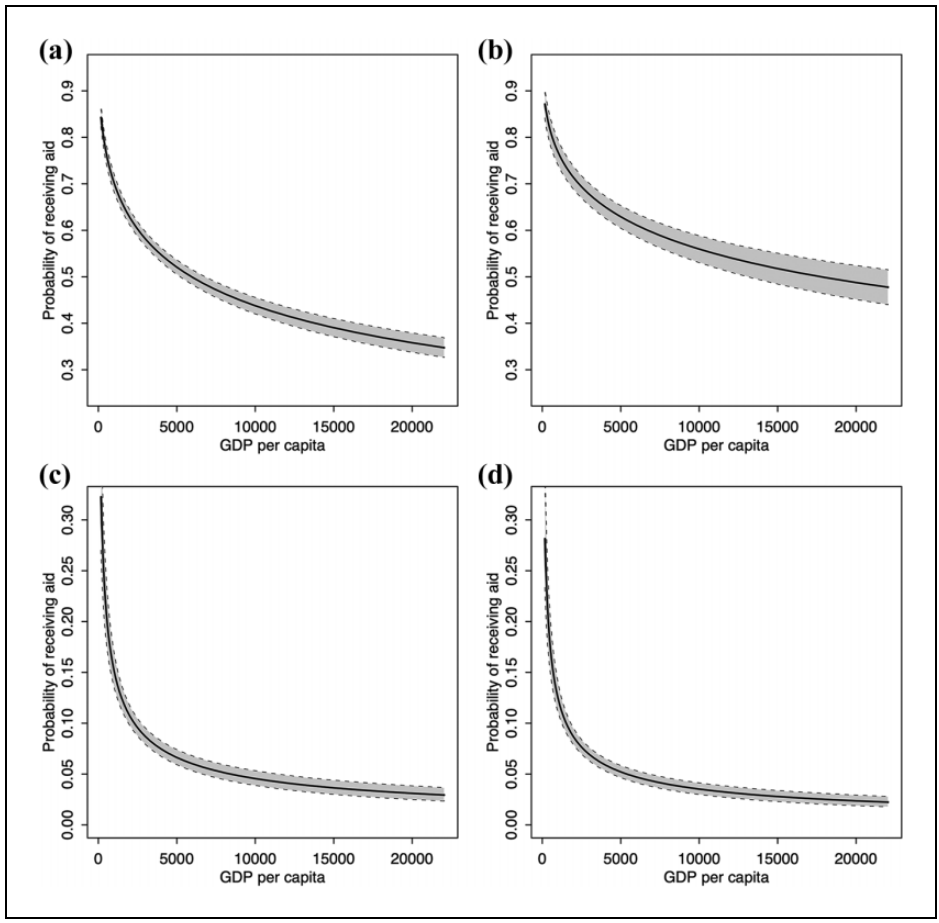

Figure 1. Selection Stage Effects for Per Capita GDP on All Tested Aid Flows (including 95% confidence intervals): (a) Development Aid (All Data), (b) Development Aid (since 2010), (c) Adaptation Aid, and (d) Mitigation Aid.

longer valid and that development aid allocation in Africa does follow – among others – the recipient need model. Even by now relatively old conclusions reported by Schraeder et al. (1998), which state that recipient needs do play a role but are trumped by donor interests, must be reconsidered in the light of the new findings reported here. Recipient needs seem to be (much) more important in the selection stage, and even in the allocation stage, they are not much less influential than donor interests, particularly when considering that there are only very few dyads trading as much as required for the highest predicted per capita aid levels. Thus, the good news of this first part or the findings is that, while both H1 and H2 are confirmed, in the African context, it seems that Tuman and Ayoub's (2004) findings for Japan that both recipient needs and donor interests play

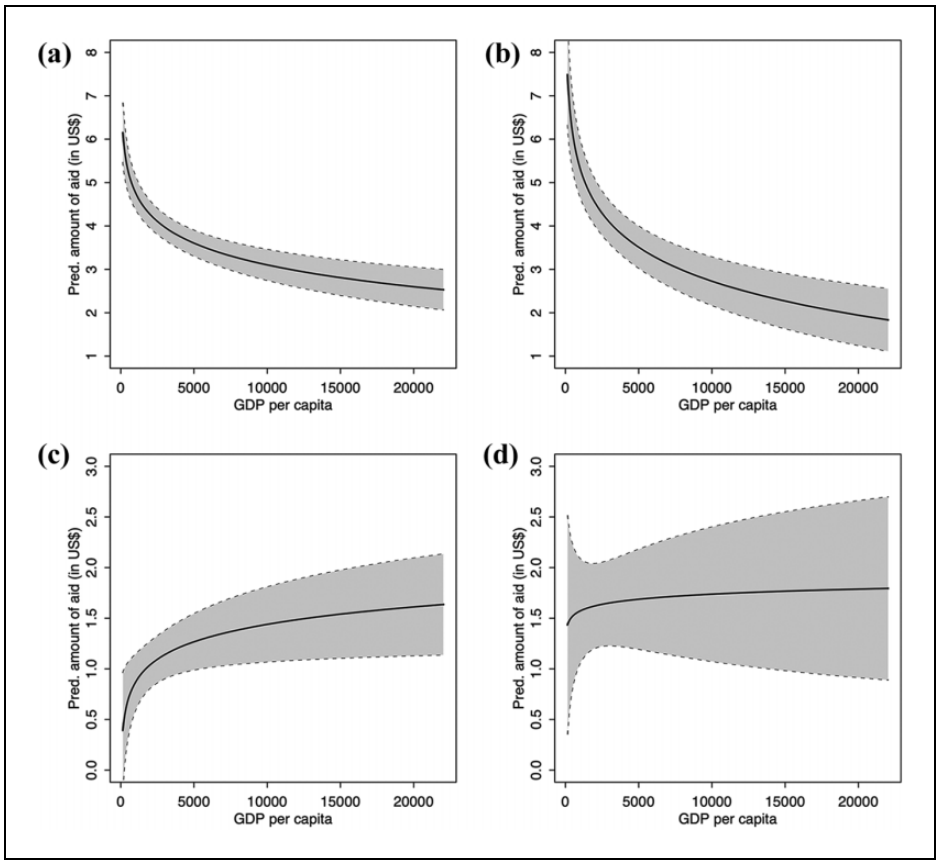

Figure 2. Allocation Stage Effects for Per Capita GDP on All Tested Aid Flows (including 95% confidence intervals): (a) Development Aid (All Data), (b) Development Aid (since 2010), (c) Adaptation Aid, and (d) Mitigation Aid.

a significant role can be generalised, with the former not being outperformed by the latter. This is also in contrast with studies on the wider developing world (e.g. see Alesina and Dollar, 2000; Hoeffler and Outram, 2011), which tends to show that donor interests are the stronger drivers for aid allocation decisions than recipient needs, and might indicate that donors do consider needs in Africa more than elsewhere. While here we can only speculate on why this might be the case,[4] further research in this direction is desirable. For adaptation and mitigation aid, the picture is somewhat mixed (see panels (c) and (d) of Figures 1 and 2). While in the selection stage both forms of aid are negatively linked to GDP per capita, indicating that richer countries are less likely to receive aid, in the allocation stage the coefficient for mitigation is not significant, and for adaptation it is even significant and positive. Particularly the latter finding is interesting, as this is contrary to recent studies on adaptation aid allocation among all developing

countries, which found that the recipient need model also holds in the allocation stage (Betzold and Weiler, 2018; Weiler et al., 2018). As GDP per capita can also be considered to be part of countries vulnerability to climate change (Brooks et al., 2005), as higher wealth increases adaptive capacity, this is an interesting finding that sets Africa apart and would merit further academic attention. For mitigation aid, the positive effect in the selection stage somewhat contradicts the idea of Bagchi et al. (2016) that traditional recipient need criteria should play no role for mitigation aid, as it should go to countries with the highest levels of greenhouse gas emissions. Instead, these findings show that in Africa, as elsewhere, allocation of new forms of aid is still linked to traditional development aid. What about donor interest in the adaptation and mitigation case? In both cases, the selection stages predict a strong increase in the likelihood of receiving aid from almost zero to about 29 per cent in the allocation case, and even more strongly to about 39 per cent in the mitigation case. The amount of aid increases by about US$1.5 over the range of the export variable for adaptation aid, and by about US$4 in the mitigation case. Taken together, these findings indicate that climate aid in Africa is still strongly linked to how "traditional" development aid is disbursed.

Recipient Merit

Recipient merit is, for the purpose of this study, captured using the WGI index, that is, a composition of all six indicators included in the WGIs. The findings are highly interesting, as the models in the selection stage predict that, over the range of the WGI variable, the effect of recipient merit has about the same magnitude as the economic self-interest variable measure by exports (and in the adaptation aid case the effect is even slightly stronger). The one exception can be seen in model 2 of Table 1, which captures only the years since 2010 for development aid. In this model, the effect is insignificant, meaning that in more recent years, recipient merit did not play a role for which countries were targeted with this form of aid. This is empirical evidence in favour of the idea of democracy fatigue in Africa, as argued by van de Walle (2016). However, in the same time frame, the two climate aid flows do seem (strongly) linked to recipient merit. It could be argued that this might be the case because Western donors are in competition with new donors, primarily China, in the realm of development aid (Kilama, 2016; Woods, 2008), while in the area of climate aid this competition is not (yet) present and conditionality therefore still applies. While this remains speculation at this point, and more research in this direction is in order, the findings here are also in line with recent studies on a global scale: while the general aid literature does find only a weak link between donor merit and aid provision (Dollar and Levin, 2006; Figaj, 2010), the relationship in the climate aid case does seem to hold (Betzold and Weiler, 2018; Weiler et al., 2018). Africa does not seem to be an exception in this respect, and therefore, there is considerable doubt about the validity of H3 in the realm of general development aid, as also the findings of the allocation stage models, albeit significant, are very small in magnitude (increasing the predicted amount of aid only by US$2–3 over the range of the WGI index). In contrast, H3 seems to be corroborated for the climate aid case.

Additionality and Climate Aid

Regarding climate aid we test – in addition to the three traditional aid allocation models – the two ideas that adaptation aid should be related to vulnerability to climatic changes (using the ND-GAIN exposure index), and mitigation aid should be based on greenhouse gas emissions to increase the provision of a global public good. While there is some evidence for the former argument (see Figure 3, panels (a) and (c)), the idea that donors promote the reduction of emissions when given mitigation aid cannot be corroborated using the CO_2 emissions measure provided by the World Bank (2018). Even in the adaptation aid case, the effects of recipients' exposure to climatic changes is relatively weak (in both stages), compared to some other findings reported in this study. Interestingly, even mitigation aid is positively related to exposure in the selection stage (panel (b) of Figure 3), but not so in the allocation stage (panel (d)). And the negative effect of greenhouse gas emissions in the allocation stage of the adaptation aid model might indicate that donors do consider the responsibility of recipients when allocating this form of aid and help predominantly those who are least responsible for the caused damage.

All these findings together indicate that additionality in the mitigation aid case does not play much of a role in the African context. Thus, we come to a similar conclusion as Bagchi et al. (2016), who state for a global sample of countries "that donors do not very clearly differentiate their mitigation related aid allocation criteria from the criteria for general ODA" (p. 18). We see this as well, both for mitigation and for adaptation aid, that the variables used to capture the traditional aid allocation models are the much better predictors of climate aid flows than our additionality measures. Other than Bagchi et al. (2016), we find no evidence that mitigation funds are allocated according to mitigation-related efficiency criteria, but we admittedly measure this more crudely for the African context, and more research in that direction using more fine-grained measures is desirable. For adaptation aid, on the other hand, the findings indicate that exposure to climatic changes in Africa is linked to the disbursement of these funds, but less so than on a global scale (see Betzold and Weiler, 2018; Weiler et al., 2018). Thus, we conclude that while there is some evidence supporting H4a, we must reject H4b.

It follows that in Africa, even more so than on the wider scale across all developing countries, climate aid follows to a large degree the allocation logic of development aid, and particularly the traditional recipient needs model (i.e. poverty) and economic self-interests of donors drive climate aid allocation decisions. The one interesting exception here is the recipient merit model, which does hold in the climate aid case, while no longer prevailing for development aid. Nevertheless, African countries should, in the context of the ongoing climate negotiations, insist that donors keep their promise and disburse climate funds according to a climate-related logic (Ayers and Huq, 2009; UNFCCC, 2015; UNFCCC, 2009), and not just give some of the flows a green label.

Conclusions

Existing empirical studies on the determinants of general development aid to developing countries often revolve around three aid allocation mechanisms, namely recipient needs,

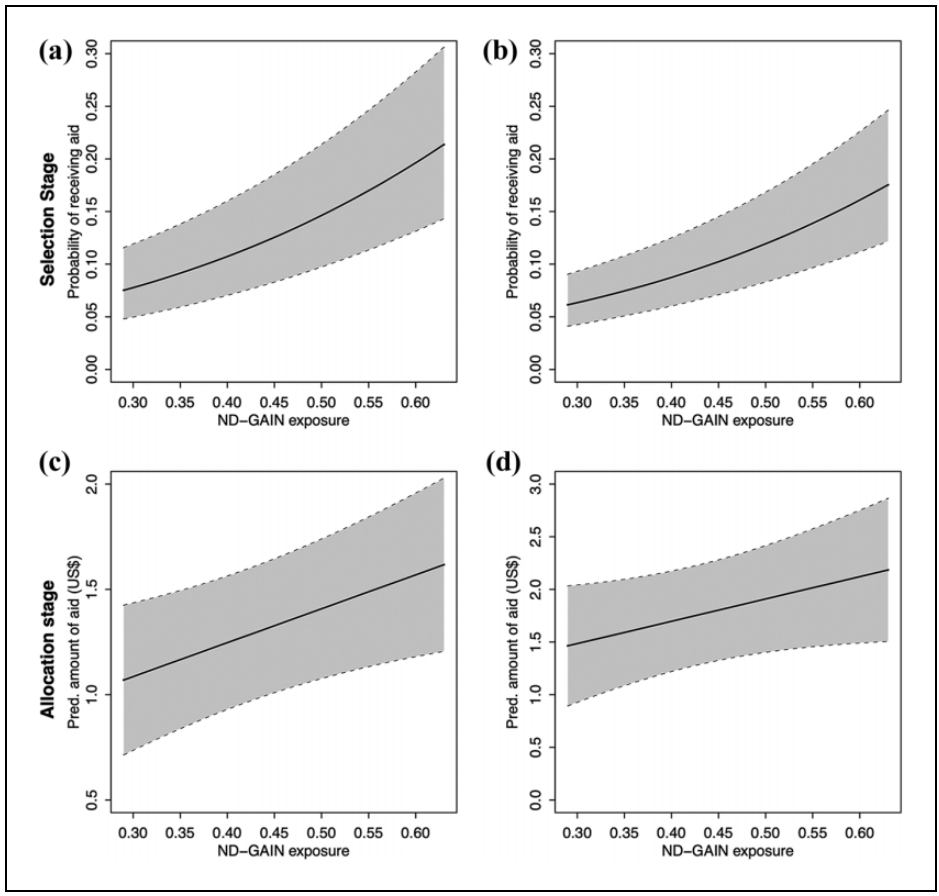

Figure 3. Effects of Vulnerability Indicator ND-GAIN Exposure on Selection and Allocation Stages for Adaptation and Mitigation Aid (including 95% confidence intervals): (a) Adaptation Aid, (b) Mitigation Aid, (c) Adaptation Aid, and (d) Mitigation Aid.

recipient merit, and donor interests (e.g. Alesina and Dollar, 2000; Collier and Dollar, 2002; Dollar and Levin, 2006; Stokke, 1989). In this study, we investigate these mechanisms specifically for the African development aid context since 1996, yet we extend the discussion by adding the dimension of additionality for the two relatively new climate aid flows, that is, mitigation and adaptation aid (Bagchi et al., 2016; Weiler et al., 2018). Thus, this study explores whether traditional aid allocation mechanisms discussed in the literature do hold in the African context, and whether they still do in more recent times, but also whether the same allocation logic can be applied to the climate aid flows, or whether these new financial flows indeed follow a different allocation logic, as demanded by recipients and promised by donors (Ayers and Huq, 2009; UNFCCC, 2015; UNFCCC, 2009). For climate aid, we propose two different hypotheses, namely that

adaptation aid should follow a need-based allocation logic with countries more vulnerable to climate change impacts expected to receive more from this funding source (Betzold and Weiler, 2018; Weiler et al., 2018), while the larger polluters in terms of greenhouse gas emission should receive more mitigation aid, as they can make the largest contributions to providing the global public good this funding stream is designed for, that is, greenhouse gas mitigation (Bagchi et al., 2016).

Our findings show that the recipient needs model for general development aid allocation is valid in the African context, which contradicts and updates older studies which concluded that aid in Africa is not linked to development needs (Riddell, 1999). At the same time, we also show that donor interests – particularly economic interests – are also strong predictors of who receives aid, and how much. This places development aid in Africa more in line with general findings reported in the aid literature (see e.g. Berthélemy, 2006b; Berthélemy, 2006a; Clist, 2011; Hoeffler and Outram, 2011). However, we somewhat surprisingly find that, in contrast to studies covering all developing countries, recipient needs are not secondary to donor interests in the African context, which we consider an interesting finding and good news. These findings for general development aid also hold for the climate aid flows. They show that climate aid to Africa largely follows development aid, which is again in line with findings reported on a global scale. When investigating the factor additionality for adaptation and mitigation aid, on the other hand, the present study shows that they tend to be weaker determinants for climate aid in the African context than globally (Bagchi et al., 2016; Betzold and Weiler, 2018; Weiler et al., 2018). Finally, on the recipient merit criterion, our study finds that this allocation mechanism does not hold for development aid in later years (while still valid in the climate aid models) and thus is evidence for the "democratic fatigue" hypothesis in Africa proposed by van de Walle (2016).

This study is novel in its approach of contrasting climate and development aid, especially in the African context, but also because it revisits the three traditional aid allocation models for Africa using the newest available data. However, as always, this study has limitations, which also represent opportunities for future research. First, the findings that recipient merit no longer holds true for development aid in more recent years due to donor competition and "democratic fatigue," while in the climate aid case, it is still valid and needs more investigation. We speculate that the reason behind this is that donor competition does not (yet) play in role in the realm of climate aid, but this needs close investigation using actual data on donor competition (including data from new donors). Second, for the purpose of this study, we use relatively broad measures to capture additionality. In the case of adaptation aid, we consider only physical exposure, while adaptive capacity is included in the general measure of GDP per capita used to operationalise recipient needs. Future research could develop finer measures to capture vulnerability, and particularly also a measure for (sector-specific) climate sensitivity (see Weiler, 2019). Also in the case of measuring additionality for mitigation aid, future research should follow Bagchi et al. (2016) and use more fine-grained measures. Finally, we only consider bilateral aid from OECD donors to African recipient countries. While this makes up the bulk of the aid flows, a comparison with multilateral aid flows and flows from non-OECD donors would be a useful venture for future research.

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Notes

1. This subtraction of climate aid from total aid to obtain development aid is done with the purpose of separating the two flows, which should follow different allocation logics according to the promise given by donors that climate aid should be "new and additional" (which leads to our theoretical considerations). There is some double counting of development aid and climate aid, hence this procedure might under-estimate development aid slightly (Betzold and Weiler, 2018).
2. In 2009, at the UNFCCC conference in Copenhagen, developed countries pledged to provide climate finance of US$30 billion a year, and to increase this sum gradually to US$100 billion a year by 2020 (UNFCCC, 2009). While these financial flows stem from a host of public and private sources and bilateral and multilateral channels, in reality they are drawn to a large degree from public aid budgets (Khan and Roberts, 2013), and are still predominantly distributed bilaterally (Betzold and Weiler, 2018). Thus, the Rio Markers are appropriate to compare the allocation of these funds to conventional development aid.
3. Projects with significant climate objectives would have taken place in any case for a different purpose (OECD, 2011). We therefore also code a second variable for adaptation and mitigation aid using principal aid flows only and run the analysis presented below again as a robustness test. We show the results for the principal aid variables, which are very similar to those presented in the main text, in Appendix Table A1. In addition, due to the volatility of aid flows (Bulíř and Hamann, 2008), we also follow the previous literature and aggregate our various aid variables into 5-year periods. The results are shown in Appendix Tables A2 and A3 and are again very similar to the annual models presented in the main text.
4. A reason might be the combination of donors recognising the urgent development needs of African countries one the one hand, combined with the marginal importance these countries play for donors' exporting industries.

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Appendix 1

Table A1. Robustness Check for Climate Aid Models Using Principal Aid Only.

	Dependent variable			
	Adaptation aid (Select. Stage)	Adaptation aid (Alloc. Stage)	Mitigation aid (Select. Stage)	Mitigation aid (Alloc. Stage)
GDP per capita (log)	−0.549*** (0.085)	0.738*** (0.220)	−0.644*** (0.089)	0.209 (0.385)
LDCs dummy	0.199 (0.132)	−0.103 (0.305)	0.011 (0.136)	−0.542 (0.536)
WGI index	0.210*** (0.016)	−0.025 (0.039)	0.209*** (0.016)	0.136** (0.064)
Exports (log)	0.248*** (0.033)	0.097 (0.068)	0.324*** (0.035)	0.328** (0.130)
UN voting	−0.319 (0.254)	−0.008 (0.398)	0.055 (0.264)	−0.31 (0.705)
Colony dummy	1.983*** (0.192)	0.21 (0.367)	1.790*** (0.189)	−2.399*** (0.630)
ND-GAIN exposure	4.569*** (0.767)	4.555** (1.842)	2.317*** (0.764)	4.388 (3.256)
CO_2 emissions	−0.031 (0.033)	−0.094* (0.057)	0.001 (0.031)	−0.139 (0.120)
Population (log)	0.501*** (0.050)	−0.638*** (0.119)	0.453*** (0.050)	−0.793*** (0.194)
Intercept	−12.616*** (1.060)	2.088 (2.744)	−11.588*** (1.104)	5.788 (4.634)
AIC	4,540.112	5,205.249	4,442.881	6,136.28
BIC	4,624.781	5,269.535	4,527.551	6,200.3
Log likelihood	−2,258.056	−2,589.625	−2,209.441	−3,055.14
Observations	8,568	1,038	8,568	1,017
Number: Donors	26	24	26	21
Number: Years	7	7	7	7
Variance: Donor	1.346	0.29	1.786	0.943
Variance: Year	0.038	0.001	0.008	0.07
Var: Residual		8.388		23.372

Note: LDC = least developed countries; WDI: Worldwide Governance Indicator; AIC: Akaike information criterion; BIC: Bayesian information criterion.

*$p < 0.1$.

**$p < 0.05$.

***$p < 0.01$.

Table A2. Robustness Check Allocation Stage Models, Using Five Year-Averaged Dependent Variables.

	Dependent variable		
	Development aid	Adaptation aid	Mitigation aid
GDP per capita (log)	−0.502*** (0.076)	−0.551*** (0.110)	−0.538*** (0.112)
LDCs dummy	−0.315** (0.158)	0.127 (0.175)	0.126 (0.177)
WGI index	0.051*** (0.017)	0.146*** (0.020)	0.180*** (0.020)
Exports (log)	0.048*** (0.018)	0.127*** (0.037)	0.233*** (0.042)
UN voting	−0.164 (0.611)	−0.808 (0.492)	−1.219* (0.494)
Colony dummy		3.124*** (0.388)	2.593*** (0.377)
ND-GAIN exposure		4.110*** (1.029)	4.397*** (1.034)
CO_2 emissions		0.05 (0.047)	0.027 (0.049)
Population (log)	0.568*** (0.054)	0.604*** (0.065)	0.515*** (0.067)
Intercept	−3.034** (1.332)	−9.772*** (1.405)	−10.188*** (1.404)
AIC	2,444.197	2,163.956	2,141.931
BIC	2,502.731	2,233.354	2,211.33
Log likelihood	−1,213.099	−1,069.978	−1,058.965
Observations	4,933	2,400	2,400
Number: Donors	26	26	26
Number: Years	4	2	2
Variance: Donor	8.172	2.686	2.248
Variance: Year	0.33	0.044	0.032

Note: LDC = least developed countries; WDI: Worldwide Governance Indicator; AIC: Akaike information criterion; BIC: Bayesian information criterion.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

Table A3. Robustness Check Selection Stage Models, Using Five Year-Averaged Dependent Variables.

	Dependent variable		
	Adaptation aid (Select. Stage)	Adaptation aid (Alloc. Stage)	Mitigation aid (Select. Stage)
GDP per capita (log)	−0.672*** (0.153)	0.121* (0.069)	−0.052 (0.127)
LDCs dummy	−0.916*** (0.296)	−0.076 (0.105)	−0.185 (0.194)
WGI index	0.133*** (0.032)	0.037*** (0.012)	0.063*** (0.023)
Exports (log)	0.285*** (0.039)	0.056*** (0.020)	0.152*** (0.041)
UN voting	−1.056 (0.757)	−0.168 (0.196)	0.029 (0.331)
Colony dummy	11.131*** (0.551)	0.258 (0.165)	−0.461 (0.289)

(continued)

Table A3. (continued)

	Dependent variable		
	Adaptation aid (Select. Stage)	Adaptation aid (Alloc. Stage)	Mitigation aid (Select. Stage)
ND-GAIN exposure		1.197* (0.634)	1.386 (1.175)
CO_2 emissions		−0.051* (0.027)	−0.029 (0.049)
Population (log)	−1.140*** (0.097)	−0.191*** (0.037)	−0.337*** (0.070)
Intercept	21.639*** (2.165)	1.511* (0.859)	3.441** (1.541)
AIC	24,513.768	3,097.18	3,965.971
BIC	24,582.441	3,161.327	4,029.186
Log likelihood	−12,245.884	−1,535.59	−1,969.985
Observations	3,801	1,027	956
Number: Donors	26	25	24
Number: Years	4	2	2
Variance: Donor	3.19	0.069	0.164
Variance: Year	0.062	0.007	0.001
Var: Residual	36.084	1.101	3.465

Note: LDC = least developed countries; WDI: Worldwide Governance Indicator; AIC: Akaike information criterion; BIC: Bayesian information criterion.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

Entwicklungszusammenarbeit und Klimahilfe für Afrika: Ein Vergleich von Allokationsmodellen für verschiedene Hilfsströme

Zusammenfassung

Diese Arbeit untersucht die Rolle verschiedener Allokationsmodelle bei der Vergabe von finanziellen Mitteln für die Entwicklungszusammenarbeit sowie im Bereich der Klimahilfe (Mitigation und Adaptation). In einem ersten Schritt werden die drei in der Literatur vorgeschlagenen Modelle - Bedürftigkeit, Verdienst und Eigeninteresse - mithilfe der neuesten verfügbaren Daten getestet. Diese Ergebnisse werden dann mit den Resultaten älterer Studien mit einem Fokus auf Afrika verglichen, aber auch mit Allokationsstudien mit einer globalen Perspektive. Für die letzten in der Studie inkludierten Jahre spielt das Modell des Verdiensts der Empfänger für Afrika keine Rolle mehr, was die neuesten Erkenntnisse anderer Studien mit globaler Dimension widerspiegelt. Abweichend von den Ergebnissen solcher globalen Studien zeigt sich für Afrika jedoch, dass die Eigeninteressen der Geberländer bei der Vergabe der Gelder nicht im Vordergrund stehen, sondern die Bedürftigkeit der Nehmerländer dominiert. Spezifisch für die Klimahilfe zeigt sich schließlich noch, dass Additionalität in Afrika eine geringere Rolle spielt als auf globaler Ebene.

Schlagwörter

Entwicklungszusammenarbeit, Klimahilfe, Allokation, Afrika